REMARKS

Claims 6-25 are pending.

Claims 6-25 stand rejected.

New dependent claim 26, which depends from claim 11 has been added, as described above. No new matter has been added.

Applicant acknowledges the Examiner's rejection of claims 6-10 and 15-19, under 35 U.S.C. § 101, in view of alleged non-statutory subject matter. Applicant traverses this rejection, but has nonetheless made responsive clarifying amendments to these claims to obviate this rejection.

Applicant acknowledges the Examiner's rejection of claims 6-9, 10, 11-14 and 24, under 35 U.S.C. § 103(a), as being obvious over *Altschuler* (4,872,122; 03 October 1989) in view of *Lawrence* (6,272,481; filed 14 September 1998). Applicant respectfully traverses these rejections, because Altshchuler, either alone or in combination with Lawrence, does not describe, teach or otherwise suggest the instant inventive claimed subject matter, and rather explicitly and fundamentally *teaches away* from the present claim subject matter by teaching statistical inference engines and classic decision trees.

Applicant acknowledges the Examiner's rejection of claims 15-18, 20-23 and 25, under 35 U.S.C. § 103(a), as being obvious over *Altschuler* (4,872,122; 03 October 1989) in view of *Lawrence* (6,272,481; filed 14 September 1998), and further in view of *Ridgeway* (6,012,052). Applicant respectfully traverses these rejections, because Altshchuler, either alone or in combination with Lawrence or Ridgeway, does not describe, teach or otherwise suggest the instant inventive claimed subject matter, and rather explicitly and fundamentally *teaches away* from the present claim subject matter by teaching statistical inference engines and classic decision trees.

No new matter has been added.

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FORMALITIES

Examiner's Interview Summary. Applicant thanks the Examiner, Sergey Datskovskiy, and the Examiner's supervisor, Anthony Knight, for the telephonic interview of 11 April 2006, wherein applicant's agent discussed the claims of record in relation to the Examiner's present 35 U.S.C. § 101-based rejection and the Examiner's present 35 U.S.C. § 103(a), over *Altschuler* (4,872,122) in view of *Lawrence* (6,272,481), and further in view of *Ridgeway* (6,012,052).

With respect to the § 101 rejection, the Examiner and Supervisor urged that recitation (*e.g.*, in claim 1) of the term "alternatives" was too abstract, and that producing a ranked set of "alternatives" was, therefore, too abstract and not considered as a 'real-world result' under the present guidelines. The Examiner suggested that the term could be replaced by "medical diagnosis." However, because applicant's agent regarded such a term as too narrow, it was decided that applicant's agent should suitably amend the claims based on support in the specification.

With respect to the § 103(a) rejection, applicant's agent reiterated the arguments of record with respect to the teachings of Altschuler, which applicant's agent regards as having been misconstrued by the Examiner. The Examiner (new Examiner in the case) and Supervisor listened to the arguments, and then declined discussion, and rather urged applicant's agent, therefore, to submit the proposed amendment/argument in view of this rejection for further consideration.

Rejection under 35 U.S.C. § 101

Claims 6-10 and 15-19 have been rejected, under 35 U.S.C. § 101, in view of alleged non-statutory subject matter. Applicant has responsively amended these claims to obviate this rejection.

Specifically, the Examiner urges that despite being implemented on a computer, the claim method is directed towards manipulation of abstract ideas in the sense that the recited term "alternatives" is allegedly abstract and not limited to 'real-world' objects, and therefore that producing a ranked set of such "alternatives" cannot be seen as a real-world result. The Examiner concludes that mere manipulation of abstract ideas are not patentable (citing *Shrader*) (Office Action at page 2, paragraph 3).

The Applicant respectfully traverses this rejection, based on the fact that the specification teaches that ranking of "alternatives" is *diagnosis* "of any problem that manifests real world symptoms" (specification at page 17, (third full paragraph). Specifically, the specification teaches that "In alternative embodiments, the system can diagnose machinery problems, software problems or any problem that manifests symptoms" (*Id*). Additionally, the specification teaches that "The invention is applicable to any subject or problem area that manifests "symptoms" or any domain that requires decision-making. Symptoms include test results, or responses to queries. For example, in the medical context, test results include cholesterol counts to determine general health or heart condition. The invention is applicable to diagnosing both inanimate and animate (*e.g.*, biological or non-biological) symptoms. Thus, the invention is applicable to diagnosing machine symptoms, software problems, or any problem manifesting symptoms" (specification at page 19, second full paragraph).

Therefore, the specification has explicit support for teaching *alternative diagnoses*, based on 'real-world' symptoms. For example, the specification, in particular exemplary embodiments teaches that alternative diagnoses can be, for example, a set of alternate *medical* diagnoses or conditions, a set of alternative *machine* problems or conditions, or a set of *software* problems or conditions, wherein the expert is a medical expert, a machine expert or a software expert, respectively, and wherein ranking the alternative diagnoses provides a list of alternate medical diagnoses or conditions, alternative machine problems or conditions or alternative software problems or conditions, respectively, ranked according to likelihood.

The Applicant has nonetheless accordingly clarified the claimed subject matter by amending independent claims 6 and 15 to recite "alternative diagnoses" is place of "alternatives." Support for this amendment is as specifically recited above. The amendments clarify that the methods encompass computer implemented method for providing a diagnosis comprising a ranked set of alternative diagnoses; such that the technology permits the function of the descriptive material to be realized in a real-world manner for a real-world result. Conforming amendments have been made to respective dependent claims 7, 9, 10, 11, 16, 18, 19 and 20. The applicant has additionally amended

claim 11 to recite particular species of the alternate diagnoses genus; namely, alternate *medical* diagnoses or conditions, alternative *machine* problems or conditions, or *software* problems. Finally, new dependent claim 26 has been added, which depends from claim 11 and recites "wherein the set of alternatives diagnoses is a set of alternate medical diagnoses or conditions, wherein the expert is a medical expert, and wherein ranking the alternative diagnoses provides a list of alternate medical diagnoses or conditions, ranked according to likelihood." Support for these amendments is as specifically recited above. No new matter has been added.

Applicant, therefore, respectfully requests withdrawal of this 35 U.S.C. § 101-based rejection, based on the Applicant's clarifying amendments.

Rejections under 35 U.S.C. § 103

Altschuler in view of Lawrence:

The Examiner has rejected claims 6-9, 10, 11-14 and 24, under 35 U.S.C. § 103(a), as being obvious over *Altschuler et al* (U.S. Patent No. 4,872,122, 03 Oct., 1989) in view of *Lawrence* (U.S. Patent No. 6,272,481, filed 14 Sept. 1998).

Specifically, the Examiner usrges that Altschuler teaches a method for ranking a set of alternatives according to likelihood, comprising: (a) configuring...a set of alternatives, a query set...(citing column 3, ll. 11-21 of Altschuler), a set of primary bias value *wherein each primary bias value directly associates a particular query with a particular alternative of the set of alternatives, and reflects at least one human expert's prior conception of the degree of predictive value of the query for the particular alternative diagnosis relative to others* (citing the Abstract of Altschuler; but note that Applicant contends as described below that Altschuler does not teach primary bias values in the instant sense because it does not teach the italicized limitation)...; (b) inputting a user's response to the query (citing Figure1A, item 12 of Altschuler); and (c) ranking, using a software program (citing column 2, ll. 47-57 of Altschuler)..., the alternatives according to relative likelihood, based at least in part of the set of primary bias values (citing Fig. 6; column 10, ll. 24-44 of Altschuler). The Examiner further states that while Altschuler does not teach using a

software program stored on the storage device that is operative with a processor of the computer, Lawrence et al. teaches using a software program stored on the storage device that is operative with a computer (citing Abstract; and Fig. 3 of Lawrence), and that it would have been obvious to one of ordinary skill in the relevant art to combine Altschuler with Lawrence to arrive at the presently claimed subject matter.

Applicant respectfully traverses this rejection, because a *prima facie* case of obviousness is not reasonably supported by these asserted references, alone or in combination. The system and method of Altschuler is *fundamentally different* than the present system and method, because <u>neither Altschuler nor Lawrence teach or suggest the presently recited Human expert-assigned primary bias values, wherein each primary bias value directly associates a particular query with a particular alternative condition of the set of alternative conditions, and reflects at least one human expert's prior conception of the degree of predictive value of the query (not the answer) for the particular alternative condition relative to other alternative conditions</u>. Additionally, Altschuler teaches and requires (see specification and claims): (a) a *statistical inference engine* using; (b) a classic *decision tree structure* comprising a set of linked nodes; (c) a computer generated *statistical data base* generated using chi square and Baynesian probability methods based on; (d) *multiple system-generated case simulations* to establish; (e) a probability tree for predicting an expert's path through the decision tree. The present system and method is fundamentally different, and does not require these elements (a-e).

Altschuler. Specifically, Altschuler teaches having an expert (assisted by computer software) establish a "decision making structure." Specifically, the decision making structure is based on initially constructing a classic 'decision tree' comprising a tree of "relational questions." The expert establishes a "root question" (root node), enters the possible responses to the root question, then enters the subsequent linked questions for each possible response. When, in the decision tree, the response to a question is a terminus or output action, the expert enters the choice from among the alternate output actions. Each response in the tree may only be linked to one parent question. (col. 3, ll. 22-40).

Once an Expert creates his decision tree, he starts an adaptive "simulator" (software). Starting at the root question (node), and at each subsequent linked question (node) in the decision tree, the system asks the expert to evaluate a case (as set of data values). The data values for the root node are randomly generated, whereas the simulated data values presented in relation to subsequent linked nodes are *biased* (but **not** in the sense of the present invention) to avoid data values that conflict with the preceding response to the linked question. For example, if a patient is not curable (answer no) then system avoids asking whether patient would benefit from a cure (**therefore biasing in the sense of Altschuler is relating a question to a particular answer by providing only those input variables that are consistent with the prior answer—and does not DIRECTLY relate a question to an output action**); the expert thus proceeds through his/her own tree structure answering the questions using the simulated case data. Random value generation and corresponding responses are repeated until a statistically significant number of responses are given to achieve a predetermined *statistical* significance for each node. The system determines which parameters (input data) are used by the expert to answer each question (**again this is not relating a question directly with output functions but rather determines which input variables are important for answering each question**). The system (*i.e.*, the software), using a chi square test, creates a *statistical data base* that determines whether a given variable is significant in the expert's choice of responses to the questions, and the likelihood of an answer to a question (*i.e.*, of the expert's answer to a particular question based on the input data) is determined by the relative values of the products of the Baynesian probabilities of the significant input values for each possible outcome. Finally, after the outcome probabilities are calculated for each node of a simulated case, the probability tree is constructed. A "modifer or editor" of the system allows each expert to change his answers to reflect new developments in the field (col.3, line 45 through col. 4, line 69).

The decision tree can be interrogated by entering situation to be analyzed. The system, using the probability tree (the probability of the expert's response at each node), can predict which path the expert will take through the decision tree to arrive at an output action. An example is discussed for prostate cancer with 22 parameters (input variables; combinatorial variables) that a physician

may look at before deciding an output action (treatment). Statistical methods are used (i) to determine which variables are significant at each decision making step; and (2) the probability that a particular expert would choose a particular output action (treatment).

In summary, Altschuler teaches an expert system for predicting an expert's decision. The system is based on: (a) an interactive *statistical inference engine* (col. 2, ll. 22-23) that is based on; (b) a *classic decision tree structure comprising a set of linked nodes* (*e.g.*, questions); wherein (c) a computer generated *statistical data base* is generated using chi square and Baynesian probability methods based on; (d) statistical processing of *multiple system-generated case simulations* (simulated data sets), to determine what case data (input parameters) is used by an expert in making a decision at each node to take one path or another through the decision tree (*i.e.*, what input parameters are considered by the expert in answer the expert's question at each node); and (e) to establish a *probability tree* that can be used to predict the expert's responses to a particular data set (input parameters).

The instant invention. By contrast, the instant invention does not require use of a non-human expert system inference engine, rules tables, etc, but represents a *novel form* of expert system designed to eliminate the need for classic inference engines and rules tables. Specifically, the present invention does not require, and is not based on a *statistical inference engine*. The present invention does not require, and is not based on a *classic decision tree structure comprising a set of linked nodes* (*e.g.*, questions). The present invention does not require, and is not based on a computer generated *statistical data base* generated using chi square and Baynesian probability methods. The present invention does not require, and is not based on statistical processing of *multiple system-generated case simulations* (simulated data sets), to determine what case data (input parameters) is used by an expert in making a decision at each node to take one path or another through the decision tree (*i.e.*, what input parameters are considered by the expert in answer the expert's question at each node). The present invention does not require, and is not based on a *probability tree*.

Additionally, and significantly, Altschuler does **not** directly relate questions to output actions (alternative conditions), rather Altschuler relates questions within nodes of a tree (addressing the issue of consistency of an answer for a particular question.
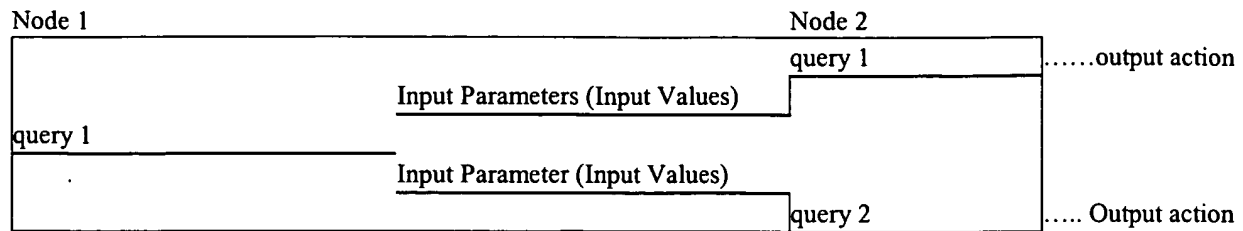
Additionally, and significantly, Altschuler does **not** teach primary and secondary bias vales as taught and required by the present invention. Altshchuler does not use expert-generated bias values, wherein each primary bias value directly associates a particular query with a particular alternative condition of the set of alternative conditions, and reflects at least one human expert's prior conception of the degree of predictive value of the query (not the answer) for the particular alternative condition relative to other alternative conditions. The instant bias values reflect at least one human expert's prior conception of the degree of predictive value of a query/response for a particular alternative relative to others; that is, bias values, are direct associations of human expert assigned values with the set of alternatives. The only mention of *biasing* in Altschuler is in relation to the computer assisted adaptive simulator aspect where the computer biases (adapts) the random number generator to reflect the type of data that would be channeled through a particular branch of the decision tree (see col. 3, ll. 50-60). Therefore, not only are the questions of Altschuyler in the form/context of a classic decision tree (not the instant invention), but there is no direct association as in the instant sense between human expert and predictive value of a question (query), rather there is only an computer assisted statistical biasing of the type of input parameters (not questions) that would be used by a particular expert in answering the expert's question (different than input parameters). This is fundamentally different than the expert-assigned primary bias values of the present invention. In the present array-based method, each and every query is directly related to each and every alternative condition by a respective bias value. Applicants, to facilitate appreciation of the fundamental differences, provide the explanatory representations below to compare the instant (Ahmed) relationship of query to alternative conditions to the classic decision tree relationships of Altschuler:

Ahmed

x/y	alternative condition 1	alternative condition 2
query 1	bias value (q1,ac1)	bias value (q1, ac2)
query 2	bias value (q2,ac1)	bias value (q2, ac2)

Altschuler

Node 1 .... Node 2

		query 1 ......output action
	Input Parameters (Input Values)	
query 1		
	Input Parameter (Input Values)	
		query 2 ..... Output action

Significantly, in the instant invention, the set of primary bias values comprises, with respect to each query, a corresponding set of alternative diagnosis-specific primary bias values each directly associating the particular query with each respective alternative diagnosis, and each bias value directly reflecting at least one human expert's prior conception of the degree of predictive value of the query for the particular alternative diagnosis relative to others.

The presently claimed subjected matter is, therefore, fundamentally distinguishable from Altschuler, alone or in combination, due to instant recitation of "and a set of primary bias values..." as discussed herein above (and recitation of secondary bias values). There is no teaching or assignment of such bias values in Altschuler, alone or in combination.

Additionally, Altschuler, alone or in combination, explicitly and fundamentally *teaches away* from the present claimed subject matter by teaching the <u>sole use</u> of statistical inference engines and classic decision trees.

Finally, referring on page 20 of the last Office Action, the Examiner states that Altschuler's experts teach possible responses to questions to build a decision tree (citing col. 3, ll. 11-21). While this may be the case, the instant experts <u>don't</u> teach possible <u>responses</u> to queries, but rather teach/provide bias values relating alternative <u>outcomes</u> (different that the responses of Altschuler) to queries, as instantly taught. The Examiner further states that "each expert's decision is entered into the system and represents his own conception of the degree of predictive value f the query for the particular *alternative* relative to others." Significantly and fundamentally, however, in Altschuler any such predictive value, if present, relates node to a particular alternative response, and not to alternative outcomes (e.g., alternative diagnoses) relative to others. Furthermore, in response to the

Examiner's comments on page 21 of the last Office Action, 'biasing' in Altschuler (by a function of a preceding response to avoid inconsistencies) is fundamentally distinguishable from the instant primary and secondary *bias values*, as discussed in detail herein above.

In view of the Examiner's comments, however, the Applicant has nonetheless made a further clarifying amendment to independent claims 6 and 15 to further emphasize and clarify the unique nature of the instant bias values. Specifically, claims 6 and 15 now recite "wherein the set of primary bias values comprises, with respect to each query, a corresponding set of alternative diagnosis-specific primary bias values each directly associating the particular query with each respective alternative diagnosis..." This amendment serves to more clearly emphasize the unique and distinguishing array-based relationship inherent to the instant primary and secondary bias values, which are not taught by Althschuler, alone or in combination with any other reference asserted by the Examiner. Support for this amendment is found throughout the originally filed specification and claims (see, *e.g.*, Figures 3, 4 and 7 and the respective specification text, showing the unique relational aspects of the instant primary and secondary biased values as discussed in detail herein).

Lawrence et al. The Examiner asserts that Lawrence et al teach a software program stored on a storage device that is operative with a processor of the computer. However, the teachings of Lawrence are limited to a general purpose integrated medical computer system to facilitate administration and housekeeping functions by coordinating various types of databases (see, *e.g.*, Abstract), and does not provide the teachings necessary, alone or in combination with Altschuler to provide the present invention as described in the arguments above.

Applicant, therefore, respectfully requests withdrawal of the Examiner's 35 U.S.C. § 103(a)-based rejection of claims 6-9, 10, 11-14 and 24.

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Altschuler in view of Lawrence, in further view of Ridgeway:

The Examiner has rejected claims 15-18, 20-23 and 25, under 35 U.S.C. § 103(a), as being obvious over *Altschuler* (4,872,122; 03 October 1989) in view of *Lawrence* (6,272,481; filed 14 September 1998), and further in view of *Ridgeway* (6,012,052).

Specifically, the Examiner paraphrases the alleged teachings of Altschuler (as described herein above), and further states that: while Altschuler does not teach a method over a wide-area network, a plurality of electronic databases of a server, transmitting the user's response to the server over the wide-area network, a software program that is operative with a processor of the server, or transmitting the ranked set of alternatives to the user subsystem over the wide-area network whereby a set of alternatives is ranked according to likelihood;—*Lawrence et al* teach a plurality of electronic databases and a software program operative with a processor; and *Ridgeway* et al teach a method over a wide area network, transmitting the user's response to the server over the wide-area network, a database of a server and a software program that is operative with a processor of the server; and transmitting the ranked set of alternative to the user subsystem over the wide-area network, whereby the set of alternatives is ranked according to likelihood (citing Ridgeway at column 30, lines 64-67; column 31, lines 1-6). The Examiner further states that it would have been obvious to one of ordinary skill in the relevant art to combine the teachings of these references to arrive at the presently claimed invention.

Applicant respectfully traverses this rejection, because a *prima facie* case of obviousness is not reasonably supported by these asserted references, alone or in combination. Altshchuler, either alone or in combination with Lawrence or Ridgeway, does not describe, teach or otherwise suggest the instant inventive claimed subject matter, and rather explicitly and fundamentally *teaches away* from the present claim subject matter by teaching statistical inference engines and classic decision trees.

Specifically, the Applicant respectfully regards these additional assertions as *moot* in view of applicant's above arguments with respect to the fundamental distinguishing required features/elements of Altschuler in comparison with the presently claimed subject matter. As stated

above, neither Altschuler, Lawrence nor Ridgeway teach or suggest the presently recited expert-assigned primary bias values. Additionally, the system and method of Altschuler is *fundamentally* different than the present system and method, because Altschuler requires: (a) a *statistical inference engine* using; (b) a classic *decision tree structure* comprising a set of linked nodes; (c) a computer generated *statistical data base* generated using chi square and Baynesian probability methods based on; (d) *multiple system-generated case simulations* to establish; (e) a probability tree for predicting an expert's path through the decision tree. The present system and methods do not require these elements (a-e).

Ridgeway. The teachings of Ridgeway relate to internet content handling, and specifically to methods to optimize processing and/or data bus usage. Specifically, Ridgeway teaches optimization of processor and/or data bus resources by: (a) creating resource (*e.g.*, internet content) "transition probabilities" (by (i) counting the number of requests for each resource, (ii) counting the number of transitions (direct and indirect) between resources, and (iii) for each possible transition, dividing the number of transitions between resources by the number of requests for the starting resource) (col. 11, ll. 22-32); and (b) "pre-fetch processes" where, during times when a server has available processing (idle), the server loads resources into its resource cache based on the resource transition model and based on the resource(s) most recently used by the server (col. 29, ll. 57-66).

Ridgeway, alone or in combination with Altschuler or Lawrence, neither teaches nor suggests the presently claimed invention that is <u>not</u> statistically driven inference engine based on classic decision tree structures. The instantly claimed subject matter is additionally distinguished by the present recitation of "and a set of primary bias values, wherein each primary bias value directly associates a particular query with a particular alternative of the set of alternatives, and reflects at least one human expert's prior conception of the degree of predictive value of the query for the particular alternative relative to others...." There is no teaching or assignment of such bias values in Altschuler, alone or in combination with Lawrence or Ridgeway.

Applicant, therefore, respectfully requests withdrawal of the Examiner's 35 U.S.C. § 103(a)-based rejection of claims 15-18, 20-23 and 25.

Altschuler in view of Lawrence:

The Examiner additionally rejected *dependent* claim 10, under 35 U.S.C. § 103(a), as being obvious over *Altschuler*, in view of *Lawrence*.

Specifically, the Examiner paraphrases the alleged teachings of Altschuler (as described herein above), and further states that: while Altschuler does not teach a software program stored on the storage device that is operative with a processor of the computer and generating secondary bias values, and ranking the alternatives by using algorithm 42;—Lawrence does teach using such a stored, operative software program; and further that generating secondary bias values, and ranking alternatives, at least in part by using algorithm 42 is conventional and well known (citing Islam et al U.S. Patent 6,115,712) (see Office Action at page 16). The Examiner further states that it would have been obvious to modify Altschuler as taught by Lawrence for the purpose of processing patient information, and to generate secondary bias values, and rank the alternatives by using algorithm 42.

Applicant respectfully traverses this rejection based on arguments that have been discussed in detail herein above with respect to the nature of limited teachings of Altschuler and Lawrence. Additionally, neither of these references, alone or in combiation teach or suggest *primary bias values* as defined and taught in the present invention, and therefore, do not teach or suggest *secondary bias values*.

Applicant, therefore, respectfully requests withdrawal of this 35 U.S.C. § 103(a)-based rejection of *dependent* claim 10.

Altschuler in view of Lawrence, in further view of Ridgeway:

The Examiner additionally rejected *dependent* claim 19, under 35 U.S.C. § 103(a), as being obvious over *Altschuler*, in view of *Lawrence* and in further view of *Ridgeway et al.*

Specifically, the Examiner paraphrases the alleged teachings of Altschuler (as described herein above), and further states that: while Altschuler does not teach a method over a wide-area network, a plurality of electronic databases of a server, transmitting the user's response to the server

over the wide-area network, a software program that is operative with a processor of the server, transmitting the ranked set of alternatives to the user subsystem over the wide-area network, whereby the set of alternatives is ranked according to likelihood and generating secondary bias values, and ranking the alternatives by algorithm 42;--Lawrence teaches a such an operative software program; and Ridgeway teaches a method over a wide-area network, transmitting the user's response to the server over a wide-area network, a database of a server and a software program operative with a processor thereof, transmitting the ranked set of alternatives to the user subsystem over the wide-area network, whereby the set of alternatives is ranked according to likelihood. The Examiner further takes notice that generating secondary bias values and ranking the alternatives using algorithm 42 is convention and well-know. The Examiner further states that it would have been obvious to modify Altschuler as taught by Lawrence and Ridgeway for the purpose of processing medical/patient information as well as better utilizing resources/communications bandwidth, and "to generate secondary bias values...."

Applicant respectfully traverses this rejection based on arguments that have been discussed in detail herein above with respect to the nature of limited teachings of Altschuler, Lawrence and Ridgeway. Additionally, none of these references, alone or in combination, teach or suggest *primary bias values* as defined and taught in the present invention, and therefore, do not teach or suggest *secondary bias values*.

Applicant, therefore, respectfully requests withdrawal of this 35 U.S.C. § 103(a)-based rejection of claim 19.
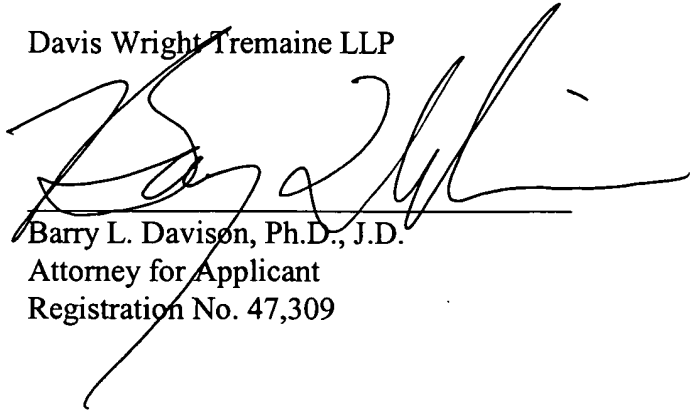

CONCLUSION

In view of the foregoing amendments and remarks, applicant respectfully requests entry of the present Response and Amendment, and allowance of all claims 6-26 as provided and amended herein above.

The Examiner is encouraged to phone applicant's attorney, Barry L. Davison, to resolve any outstanding issues and expedite allowance of this application.

Respectfully submitted,

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